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# West European Natural Gas Requirements: Looking to the 1990s

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An Intelligence Assessment

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An Intelligence Assessment

*Information available as of 13 May 1982  
has been used in the preparation of this report.*

This assessment was prepared by [redacted]  
[redacted] Energy Division, Office of  
Global Issues. Comments and queries are welcome  
and may be addressed to the Chief, Energy Markets  
Branch, OGI, [redacted]

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[redacted] 25X**West European  
Natural Gas Requirements:  
Looking to the 1990s** [redacted] 25X**Key Judgments**

Rapid escalation of European gas prices, together with lowered prospects for economic growth, has transformed the outlook for the West European gas market. In the past two or three years, many industry analysts have trimmed their estimates of Western Europe's gas needs in 1990 by more than 20 percent. In turn, West European countries should have greater flexibility than they had anticipated in choosing their gas suppliers. Still, decisions on major new projects must be reached soon in order to obviate the need for additional purchases of Soviet gas in the 1990s.

Lowered projections of West European gas imports have already affected contract negotiations for gas supplies from the Soviet Union. As originally planned, the Yamal gas pipeline was to have carried 670,000 barrels per day oil equivalent (b/doe). The West Europeans have already reduced that amount by at least 20 percent and may reduce it further.

Given the economic growth and natural gas pricing patterns that are now materializing, West European gas consumption will increase slowly through the 1990s. [redacted] demand will total only 4.5 million b/doe by the end of the century. The Soviet Union will be contending for as large a share of this market as it can get—along with the Norwegians, Algerians, and other potential suppliers. The market shares of these producers in the 1990s will depend on development decisions taken by the importing countries in the next several years. 25X

In choosing suppliers, the Europeans will have to weigh both economic and security factors. Norway alone could probably supply an additional 670,000 to 830,000 b/doe to Western Europe by the mid-to-late 1990s. To help make the Norwegian supplies competitive with Soviet gas, however, the West Europeans will have to offer financing subsidies similar to those given Moscow on the Yamal project. Even then, the Soviets may have a pricing edge because Moscow probably will accept relatively low prices to ensure hard currency earnings.

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## West European Natural Gas Requirements: Looking to the 1990s

### Recent Trends

West European natural gas consumption rose sharply during the 1970s, jumping from 2.5 million barrels per day oil equivalent (b/doe) in 1973 to 3.7 million b/doe in 1979.<sup>1</sup> The growth in gas demand ended abruptly in 1980, when total consumption declined for the first time after two decades of uninterrupted growth. Demand in the Netherlands and Belgium has declined especially fast, and the drop has been more than 10 percent in West Germany. Consumption in the United Kingdom and Italy has dropped more slowly. French gas use rose—mainly as a result of increased industrial gas consumption. Provisional data indicate that the weak market for gas continued into 1982, with use expected to approximate 3.4 million b/doe.

The falloff in European gas consumption can be traced to slow economic growth and sharply higher gas prices. Industrial production in the European Community is still 4 percent below the 1980 average. On the price front, the nominal price of Dutch gas exports, the basis for most European gas pricing, has more than doubled since 1978 (figure 1). In 1980 the Dutch were able to renegotiate prices with most European clients—linking the price of gas to the price of low-sulfur fuel oil. In October 1981 the Dutch increased the price of gas to \$4.45 per million BTU<sup>3</sup>—nearly 60 percent higher than average 1980 prices (table 1). The cost of gas from the USSR and elsewhere has followed a similar upward pattern. Algerian gas prices, for example, rose from near parity with US-controlled prices in 1978 to almost 2.5 times the US price in 1981.

### Changing Outlook

The decline in West European gas consumption is expected to bottom out this year. Once economic recovery begins, demand is expected to revive, albeit at a more moderate pace than previously anticipated.

<sup>1</sup> Data are for 15 West European members of the IEA plus France.

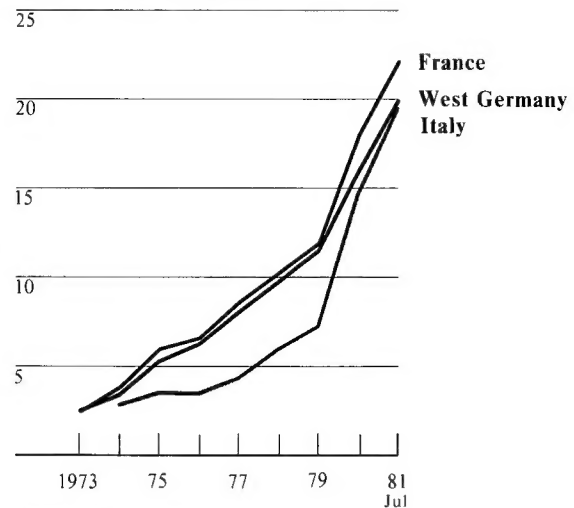
<sup>2</sup> Europeans usually measure gas quantities in billion cubic meters. One billion cubic meters per year is approximately 16,700 t./doe.

<sup>3</sup> One barrel of crude oil equivalent = 5.62 million BTU.

Figure 1

### Netherlands: Natural Gas Export Prices<sup>a</sup>

US \$ per barrel oil equivalent



<sup>a</sup> Price at Dutch border.

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For one thing, economic growth during the balance of the decade is apt to be slower than was forecast a few years ago. The recent and continuous rise in natural gas prices will also influence the level of demand in the years ahead. Upward pressures on gas prices are likely to persist throughout the next decade as the Europeans increasingly shift to greater volumes of more expensive imported gas. Several analyses of the issue indicate that most European natural gas use is highly responsive to both the level of gas prices and the cost of gas relative to available alternatives.

As a result of these factors, all forecasts of West European gas requirements are being revised downward (figure 2). The most recent West European government forecasts point to 1990 West European requirements of 4.9 million b/doe. These government

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**Western Europe: Gas Prices**

*Gas prices in Western Europe will increase sharply during the decade. Cheap indigenous supplies are dwindling, and new gas reserves—those in the North Sea, for example—will be costly to develop:*

- *The British Gas Corporation (BGC) has begun negotiations for new North Sea supplies. BGC probably will have to pay more than twice the average price now being received by suppliers. A UK Government policy to weaken BGC's role by allowing producers to negotiate directly with purchasers is expected to result in further increases.*
- *Dutch prices will also increase; the base price of gas will rise to near parity with low-sulphur fuel oil prices by 1983 and will follow an indexation rate of 95 percent with a five-month lag. The Dutch reserve the right to renegotiate export contracts if a customer settles deals at higher prices with other gas suppliers.*
- *Norwegian gas will also be expensive because of the high cost of developing remote North Sea reserves and the Norwegian policy of pricing delivered gas on parity with crude oil.*

*consumers would fall with declining oil prices. The shift to more expensive gas imports will tend to boost average prices. Higher Dutch prices have been matched by the Soviets and have been exceeded by the Algerians. Following the French-Algerian gas deal, Gas de France requested a 14-percent rate hike, and further increases will be necessary. Some Spanish customers are paying gas prices equal to crude prices on a heat-equivalent basis. Imports from non-European sources—currently less than 15 percent of total West European gas supplies—are expected to increase to about 30 percent by 1990.*

*Gas prices also are being pushed upward by changing use patterns. As residential gas consumption rises, storage and distribution capacity must be expanded to meet larger fluctuations in seasonal demand. New storage facilities are under construction in West Germany and France, and Distrigaz in Belgium is planning to spend \$175 million by 1986 to expand storage capacity to meet winter demand. Ultimately, the consumer will have to pay for the new facilities. Moreover, many industrial consumers will have interruptible contracts that raise the real cost of gas to industry.*

*Despite the increasing linkage between oil and gas prices, it is unlikely that European gas prices to final*

projections, however, will almost certainly prove too high because prices will be substantially higher than was assumed when the forecasts were made.

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**Table 1** US \$ Per Million BTU  
**Natural Gas Export Prices, 1982<sup>a</sup>**

Exporter	Price	Comment
Algeria	5.10	Price of LNG to France, f.o.b.
Netherlands	4.45	Price at Dutch border
Norway	4.25	Price at Emden, c.i.f.
USSR	4.65	Basis of new contract with West Germany

<sup>a</sup> Price per million BTUs can be converted to price per barrel crude oil equivalent by multiplying by 5.62.



West European natural gas consumption will increase by no more than 1 million b/doe between now and 1990. As domestic supplies are depleted or shut in and countries turn increasingly to imports, import dependence will grow from the less than 15 percent currently to about 50 percent for all of Europe by the turn of the century. Although progressively less gas will be used in electrical generation, industry will come to rely on gas for about one-fourth of fuel needs. Continentwide, the residential sector would be even more heavily dependent on gas.



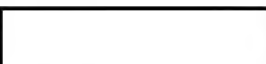
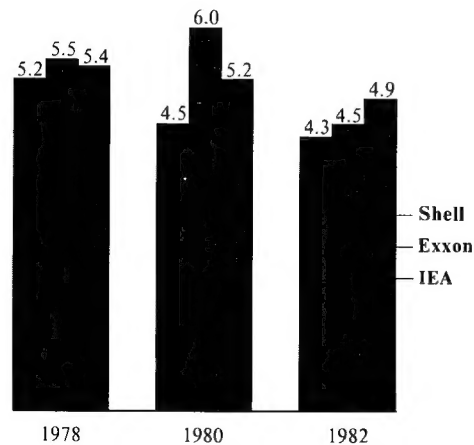
#### Demand Close Up

Gas demand in individual countries will grow, but much less rapidly than government planners have been talking about, because of higher prices and slower growth prospects (table 3).

West German gas requirements by 1990 will reach 940,000 b/doe, up about 125,000 b/doe over this year, primarily on the strength of increased residential use. Higher prices will constrain growth in West German industrial use; gas is now considerably more expensive on a heat-equivalent basis than coal or residual fuel oil (figure 3). In France, growth in the use of gas will be limited by competition with electricity, which is in abundant supply. Moreover, electricity prices in real terms are

**Figure 2**  
**Western Europe: Changing Projections of Gas Demand in 1990**

Million b/d oil equivalent



expected to decline substantially. French industrial gas requirements will increase relatively slowly because of price competition from electricity and government efforts to promote industrial use of electric power.

Natural gas requirements in Italy, the Netherlands, and Austria will also fall well short of what had been anticipated:

- Italian gas needs will increase by only about 200,000 b/doe between now and 1990; most of this gain will occur in the residential sector, where gas still has a large price advantage over alternative fuels.
- Dutch gas requirements will increase only slightly, since both the residential and industrial sectors are already gas intensive.
- Austrian requirements will also increase by relatively small absolute amounts, reflecting the small size of the economy.

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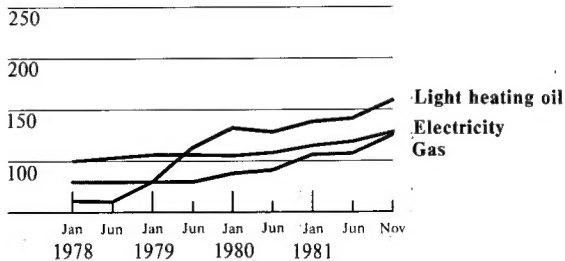
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### Western Europe: Sectoral Gas Demand

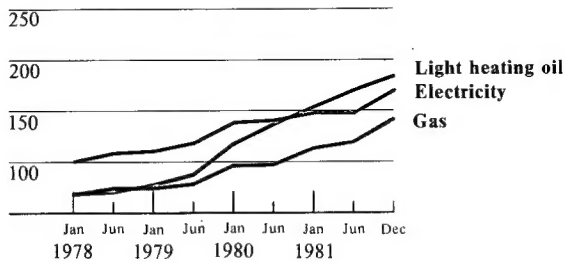
#### Residential Heating Costs<sup>a</sup>

Index: Jan 1978 electric heating costs=100

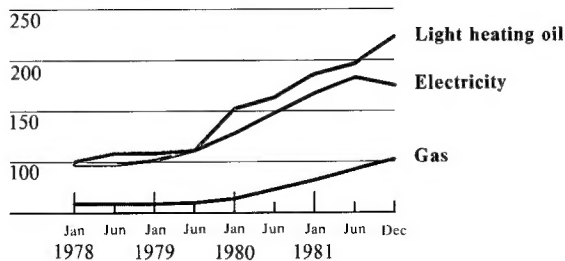
##### West Germany



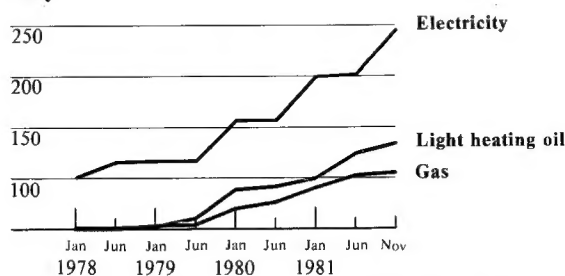
##### France



##### United Kingdom



##### Italy



<sup>a</sup> Cost per BTU of output from furnaces, assuming average heating efficiencies of 1.0 for electricity, 0.6 for gas, and 0.5 for oil.

Although gas use is generally expected to increase in the residential and industrial sectors, its competitiveness in fuel markets can vary substantially among countries.

#### Residential

Residential heating demand will be the fastest growing market for gas in Western Europe. Despite the rapid increases in gas prices, gas is still the cheapest means of home heating.

- Italian residential gas consumption should grow rapidly during the 1980s because oil and electric heating costs are considerably higher than gas heating costs. Southern Italy's gas consumption is expected to double if additional supplies are brought on stream from the newly completed Algerian gas pipeline. Rome expects Italian residential gas consumption to increase 50 percent by 1990.
- In the United Kingdom, residential costs for gas heat are only about one-half the cost for oil heat. As a result, London expects residential gas consumption to increase by more than 30 percent during the 1980s. The prospect of higher gas prices, however, suggests that increments in residential use will probably be lower. The government has already implemented a plan to raise residential gas prices to near parity with oil.
- Growth in the French and West German markets will be moderated by gains in electric heating. In West Germany, gas heating costs have risen to near parity with electricity. In France, gas will encounter stiff competition from declining real electricity prices during the decade. Cheap off-peak electricity, along with the low capital costs of electric heating with coupled thermal storage, will make electricity the preferred heating fuel in French homes.

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- *In Austria the decontrol of oil prices should push Austrian residential gas consumption upward. Denmark is planning to introduce gas heating on a massive scale as supplies become available from offshore production. In the Netherlands, where 80 percent of heating needs are now met by gas, there is little room for further growth.*

#### **Industrial**

*The prospects for gas use in the industrial sector are mixed. The iron and steel industry probably will reduce gas consumption by about 60 percent by 1990. Natural gas consumption in the West European chemicals industries, on the other hand, is expected to increase. Several OPEC nations are planning sizable investments in petrochemicals during the decade. If the plans are carried out, the cost advantage of OPEC producers will slow the growth in the European industry, and gas requirements will moderate.*

*Gas use in industrial boilers—the largest industrial consumer of energy—should trend upward. A continuing reluctance to invest in coal-burning equipment may inhibit a switch to moderately priced imported coal in this sector, and gas and oil will remain strong competitors for the future market.*

#### **Electricity Generation**

*Gas consumption by electric utilities will continue to decline. Impressive gains in cheap nuclear- and coal-fired output, coupled with sluggish growth in electricity demand, should reduce the sector's gas needs by 125,000 b/doe by 1990. West German utility gas consumption, the largest in Europe, is projected to fall by about 100,000 b/doe by 1990. As a group, European governments are pursuing policies to trim gas use to less than 5 percent of fuel for electricity generation by 1990.*

**Table 3**

Thousand b/doe

#### **Selected West European Countries: Natural Gas Requirements**

	1979	1981	1982 <sup>a</sup>	1990 <sup>b</sup>
West Germany	946	846	816	940
United Kingdom	824	784	782	850
Netherlands	668	594	576	620
Italy	462	426	420	620
France	402	418	426	580
Belgium	190	174	166	220
Austria	80	78	82	130
Spain	32	42	44	100
Switzerland	16	20	18	30

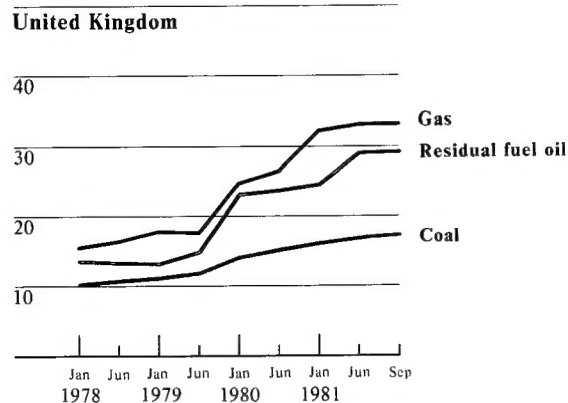
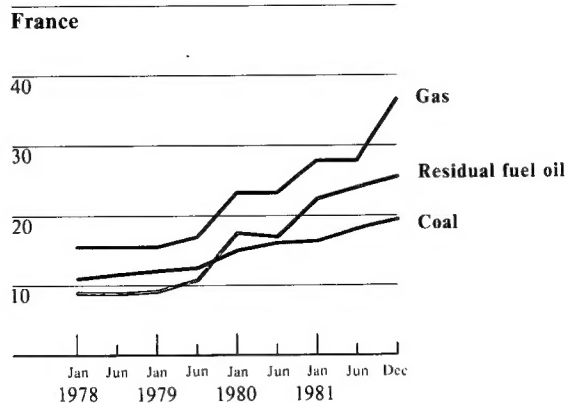
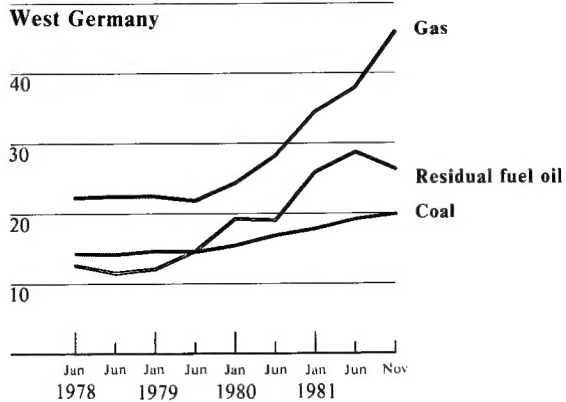
<sup>a</sup> Estimated.

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**Secret****Figure 3****Industrial Energy Prices**

US \$ per barrel oil equivalent

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**Soviet Gas Contract  
Negotiations: Status Report**

*Austria and the Soviet Union have reached agreement on a gas delivery contract that will run for 20 years. The Austrians will take an additional 22,000 b/doe, with an option for an additional 17,000 b/doe. The price of the gas, however, has yet to be settled. Austria had been originally negotiating for an additional 83,000 b/doe. In 1981 the USSR provided Austria with 30 percent of its total gas imports.*

*Belgium is negotiating with the Soviets for the delivery of gas supplies to begin in 1984. To ensure flexibility of supply, Belgium has decided to limit Soviet imports to a maximum of 33,000 b/doe, or one-sixth of their projected 1990 gas consumption. Brussels expects gas demand to grow by less than 1 percent a year, with 1990 consumption only marginally higher than 1979 use, and may not authorize any purchases of Soviet gas.*

*France recently concluded a contract with the Soviet Union for 140,000 b/doe of natural gas per year. The contract will run for 25 years, and the price will be linked to crude oil and oil product prices. The contract, however, permits French purchases of as little as 105,000 b/doe each year without Soviet authorization or penalty. The amount the French purchase will depend almost entirely on the price of gas supplies from other available sources.*

*West Germany, the first country to contract for Soviet gas from the pipeline, agreed to import*

*In other European countries, gas demand is likely to develop along similar lines, with the strongest growth occurring in the residential sector and secondarily in industrial plants. Plans call for a steady reduction in gas use for electricity generation. Overall, West European utility gas use should be reduced to less than 4 percent of total fuel requirements by 1990.*

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175,000 b/doe per year at a price linked to oil prices. The Germans, however, do have an option under the contract to reduce purchases by up to 20 percent if the Soviets are notified at discussions in October. Several energy companies holding shares in Ruhrgas are pressuring the firm to exercise this option.

Italy and the Soviets reached "technical agreement" on a gas contract in late January. SNAM, the Italian gas distributor, and the Soviet gas exporter agreed on a price and quantity of gas. The Italian Government, however, has yet to grant final approval. The considerable opposition which exists within the Italian Government to the Siberian gas deal is based in part on Socialist desires to conclude the contract with Algeria first.

The Netherlands was negotiating with the Soviet Union for 33,000 b/doe of natural gas annually. With weak industrial demand for gas and the overall decline in gas consumption, however, it is very likely that the Dutch will not take any Soviet gas. The Dutch feel slighted by the Soviets for the apparent snubbing of Dutch industry when contracts were awarded for the pipeline.

Spain recently requested that the Soviet Union open talks on gas supplies. The Spanish Government, however, has postponed the talks until at least July, arguing that political and economic considerations indicate the need for more detailed study. At present,

Spain plans to import 33,000 b/doe per year. The price must compete favorably with the \$4.50/million BTU Spain now pays for liquefied natural gas from Algeria and Libya. Madrid expects gas consumption to increase sharply, primarily for use in the chemicals industries and as a boiler fuel. For gas use to increase, however, an extensive infrastructure must be developed.

Greece is also interested in purchasing Soviet gas. Preliminary talks have just been concluded in Moscow for a possible supply of 33,000 b/doe a year for seven years. However, an entire gas infrastructure must be built if gas is to become an important energy source in Greece. At present, Greece consumes no natural gas.

Switzerland plans to import Soviet gas via West Germany. The Swiss and the West German utility, Ruhrgas, have agreed in principle on a delivery contract. The Swiss would purchase 8,000 b/doe annually, with an option to take another 3,000 b/doe. Deliveries would begin in 1988. The Swiss purchases, however, would require Ruhrgas to sign an additional contract with the Soviet Union since the original West German-Soviet contract prohibits Ruhrgas from exporting Soviet gas.

#### Impact on Pipeline Negotiations

These more realistic assessments of future gas requirements are having some impact on the Soviet gas deal. Most West European countries have scaled back their proposed purchases, and some are seeking reduced volumes in present contract negotiations. As a result, the West European countries have reduced their planned Yamal pipeline purchases to 520,000 b/doe or less. Originally, the pipeline was to have

provided an additional 670,000 b/doe. Including purchases under previous deals, West Europeans could be taking nearly 1 million b/doe of Soviet gas.

Even with this scaling back, continental Europe<sup>4</sup> will depend on the USSR for 25 to 30 percent of total 1990 gas requirements if the pipeline proceeds as now

<sup>4</sup> Western Europe excluding the United Kingdom.

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planned. For several countries, levels of dependence will be higher; Italy and West Germany, for example, will depend on the Soviets for 40 percent of their total gas requirements by the end of the decade. [ ]

#### Requirements Beyond 1990

Beyond 1990, West European gas requirements will probably continue to rise in absolute terms and,

[ ] gas will increase its share of total energy consumption. Demand projections for the 1990 to 2000 period, however, are not especially reliable because of the obvious uncertainties associated with such long-term projections. [ ]

financing. If West Europeans continue to offer subsidized financing to Moscow, for example, they are likely to end up with a second Yamal pipeline, even though alternative supplies could be obtained. In the case of Yamal, the subsidy in effect shaved 3 to 5 percentage points from market interest rates Moscow would otherwise have had to pay. This in turn cut 10 to 15 percent from the estimated cost of delivering gas to Europe. If alternatives to Soviet gas are to be developed, similar interest rate subsidies must be offered for these alternative projects; or, at a minimum, their competitive position will have to be protected by not providing subsidies to the USSR. [ ]

**North Sea Options.** The Netherlands, currently Europe's largest gas supplier, would be the most reliable and economical source of additional gas. Under current government policies designed to conserve gas resources, the volume of Dutch gas available for export in the late 1990s will dwindle to less than 170,000 b/doe. This situation could change:

- Gas deliveries under existing contracts—due to phase out in the early 1990s—can probably be stretched through the mid-1990s by deferring gas deliveries from earlier years when available supplies exceed demand.

#### Alternative Supply Options

[ ] Western Europe will need to contract for additional supplies from the Soviet Union or elsewhere for the period after 1990 (figure 4). With demand increasing and domestic production expected to fall, especially in the United Kingdom, the policy of the Netherlands not to renew contracts for gas exports confronts the other Europeans with a widening gas supply gap of 1.1 to 1.5 million b/doe in the year 2000. Although new supplies must be lined up fairly soon, the next two to three years offer a window of opportunity during which projects could be launched that would obviate the need for additional European purchases of Soviet gas in the 1990s. These new supplies might account for 850,000 to 1.3 million b/doe by the year 2000. [ ]

Maximizing non-Soviet supplies will depend on assessments of the relative costs of alternative gas supplies. This in turn will depend heavily on assumptions about the interest rates charged for project

- Given the size of Dutch gas reserves and the budgetary pressures confronting The Hague, we believe new export contracts might be authorized. [ ]

Norwegian gas offers a secure but costly alternative to Soviet gas. Norway could potentially supply an additional 670,000 to 830,000 b/doe:

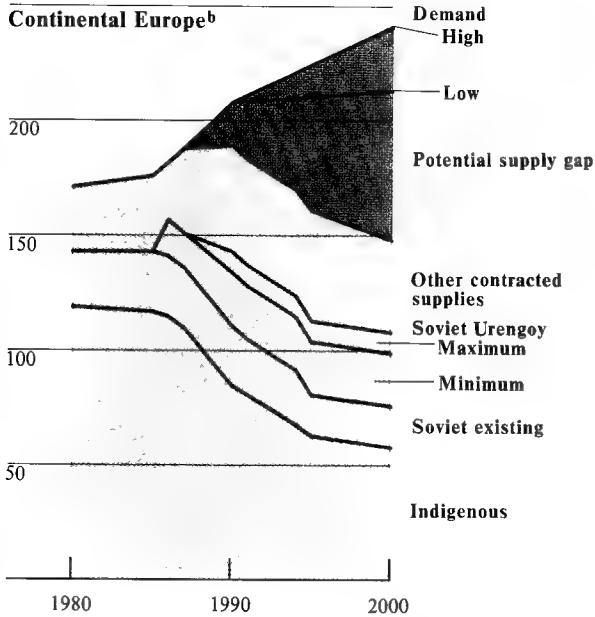
- Norway has huge gas reserves—at this time about 18.0 billion barrels oil equivalent—and the government believes there is considerable potential to add to this total.
- Norway's new conservative government has already taken steps to accelerate resource development; however, additional measures would be required to reach full export potential.

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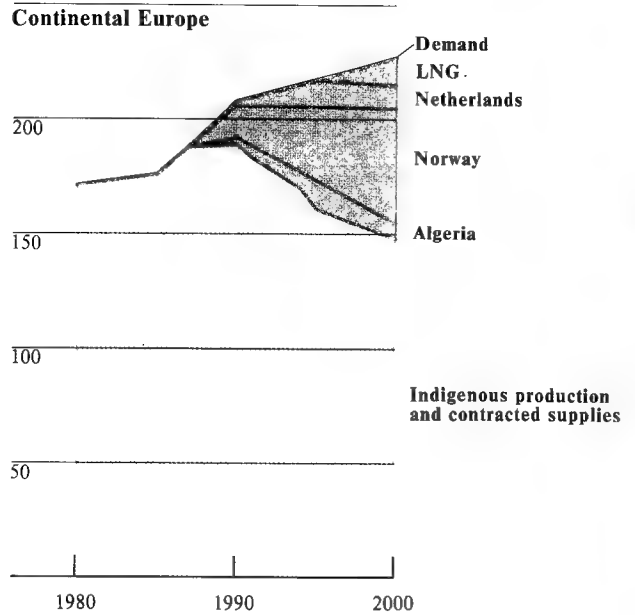
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**Figure 4**  
**Natural Gas Supply and Demand<sup>a</sup>**

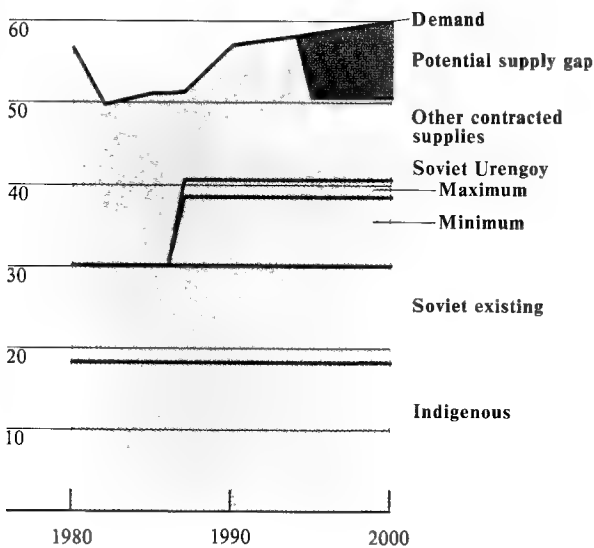
**Supply and Demand Forecast**  
Billion cubic meters



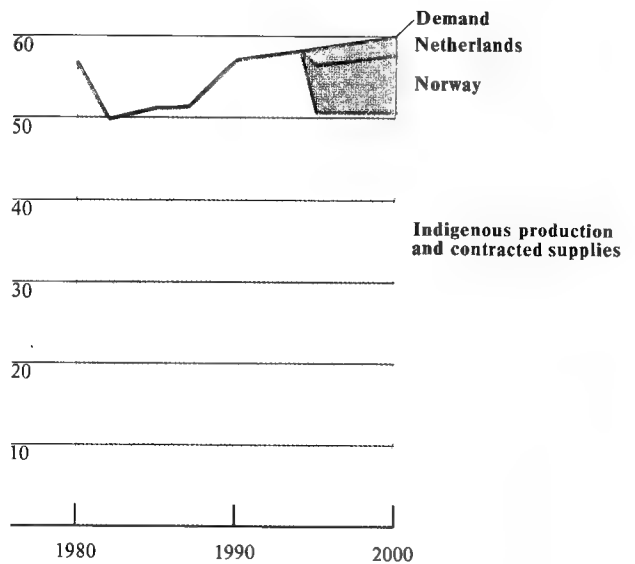
**Potential New Gas Supplies**  
Billion cubic meters



**West Germany**



**West Germany**



<sup>a</sup>In some years in the 1980s, available gas supplies under existing contracts may exceed demand. In those years, some countries will accept deliveries of less than full contracted volume.

<sup>b</sup> Western Europe excluding the United Kingdom.

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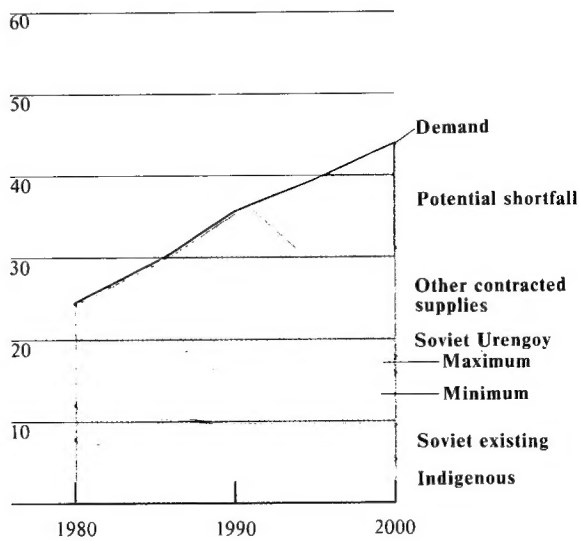
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Figure 4 (continued)

**Supply and Demand Forecast**

Billion cubic meters

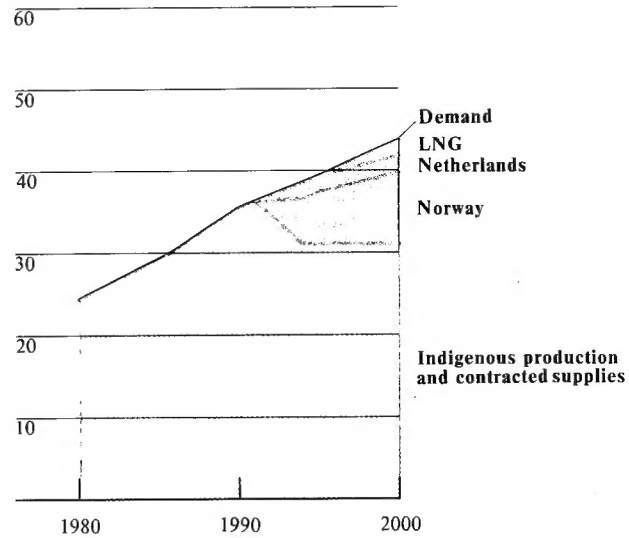
**France**



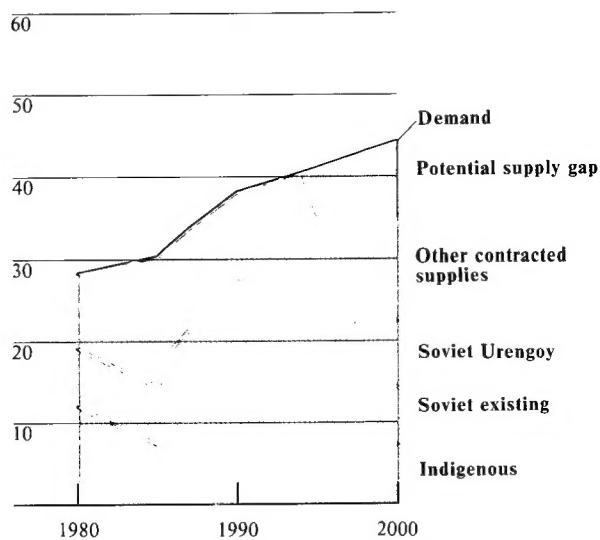
**Potential New Gas Supplies**

Billion cubic meters

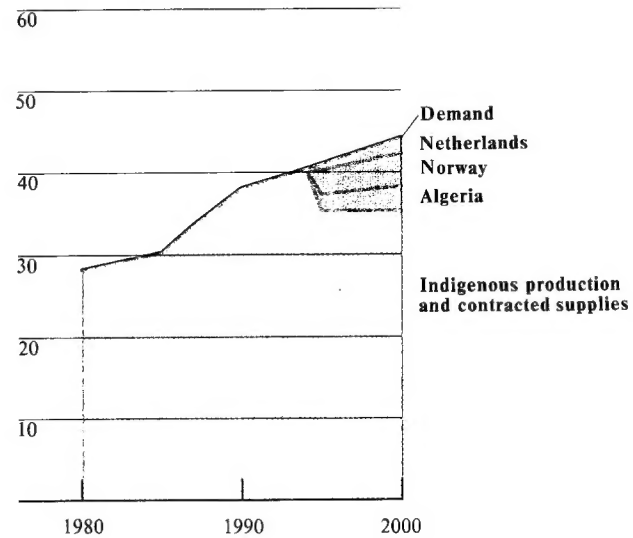
**France**



**Italy**



**Italy**



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- If a triangular gas deal can be arranged—using the United Kingdom as a conduit for delivering gas to the Continent—substantial savings of time and money could be realized in delivering 170,000 to 250,000 b/doe of gas to Europe beginning in the early 1990s.
- Given the high cost of developing Norway's gas-fields and building major trunklines to the Continent, large additional supplies of Norwegian gas would probably cost 15 to 20 percent more than Soviet gas if no interest rate subsidies were offered for the Norwegian project. [ ]
- Although the original proposal for Nigeria's Bonny LNG project has collapsed, a scaled-down version of the project—to deliver 135,000 b/doe—might be completed.
- The Cameroon's Kribi LNG project can supply 115,000 b/doe in the early 1990s if political and institutional problems can be overcome.
- Qatar has huge gas reserves in its north gasfield and might supply 135,000 b/doe late in the 1990s. [ ]

**African/Middle East Options.** Algerian gas can be produced and delivered to Europe at well below the cost of Norwegian gas. An additional 80,000 to 100,000 b/doe could probably be delivered through existing Trans-Mediterranean pipelines and up to 250,000 b/doe through a new pipeline to Spain. Field development costs are relatively low, and the feasibility of undersea pipeline connections to Western Europe has been proved. However, Algeria's militant pricing policy and its unilateral suspension of gas deliveries to France and the United States in 1980 label it as a potentially unreliable supplier. [ ]

Proposed gas pipelines from Africa or the Middle East to Western Europe are probably not politically or economically practical at this juncture. Any such pipeline would probably cross several unstable countries and could cost from \$30 to \$60 billion. Supplies from a Trans-African pipeline, carrying gas from Nigeria and Cameroon to Europe, would be subject to disruption in any of the countries crossed and would probably face high transit fees. Given the lowering projections of demand, it will be difficult to line up European support for these systems. [ ]

**LNG and Coal Options.** All the LNG projects under consideration to supply Western Europe would probably be expensive because of high delivery costs. Some of the projects must overcome political uncertainties:

- Canada could supply 80,000 b/doe of gas to Europe beginning in 1990 if technologies for exporting LNG from arctic waters are proved.

Aside from these options, the West Europeans could make greater use of coal to meet their 1990 to 2000 energy requirements. Reasonably priced steam coal is available in virtually any quantity from the United States, Australia, and other exporting countries. Market studies show that the use of imported coal will grow in the West European utility and industrial sectors. In the residential sector, more direct use of coal does not seem likely in the absence of some technological improvements. Coal can provide a greater portion of residential energy needs indirectly through electricity from central generating plants and possibly later through the production of synthetic gas or liquids from coal. [ ]

#### Security of Supply Implications

The West Europeans are certainly aware of the dangers of becoming overly dependent on the Soviet Union for imported gas and probably would be willing to pay a premium for security. The French and West Germans have indicated this willingness in talks with the Norwegians. If West European governments take advantage of the options available, they can substantially reduce their dependence on Soviet gas and, in turn, reduce the amount of hard currency the USSR will earn from gas exports. Possible patterns of gas supply and demand during the next two decades indicate that in the case of Italy enough alternative gas can be found to reduce dependence on Soviet supplies from about 40 percent in 1990 to only about one-third in the year 2000. In the case of France, dependence could be reduced to 25 to 30 percent; and for continental Europe as a whole, dependence would not exceed 25 percent. If, on the other hand, the West

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Europeans agree to a second Yamal pipeline to help fill the supply gap from 1990 to 2000 with Soviet gas, the level of dependence on the USSR would increase greatly. For continental Europe as a whole, dependence on Soviet gas would exceed 35 percent by the mid-1990s, assuming that a second Yamal line matches the first in capacity. [REDACTED]

The factors that led the Soviets to conclude the first Siberian gas deal—huge gas reserves and continued needs for hard currency earnings and technology—will probably eventually lead to a proposal for a second pipeline. Judging by Soviet behavior in negotiating the first Yamal pipeline, additional gas supplies would be offered at a base price near the low end of the market. By accepting a relatively low price initially, the Soviets would increase their market penetration and secure hard currency earnings. This move would partially counteract an expected falloff in earnings resulting from declining oil exports in the 1990s. If future gas prices were also linked to oil prices, the Soviets could expect to increase earnings substantially over the following years of long-term gas contracts. [REDACTED]

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